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Date Printed: Nov 02, 2007 15:49

PAPER NUMBER:	LTR-07-0736
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Date: 10/31/2007 9:23:52 AM
Subject: IMECE2003-43540 (2).doc

Dear Solicitor General Paul D. Clement ET AL:

This is to inform you that the TI-83 Calculator (Identification Number: 33608885 I-0898J Assembled in ROC, Taiwan) that had been delivered to the Clerks Office on October 30, 2007 can be used to check the IMECE2003-43540 paper being forwarded to you. Mr Richard Stutman, now is the current President of Boston Teacher Union, is therefore a very important witness of the current Supreme court Cases 06-1705 and 07-209.

2003 ASME INTERNATIONAL MECHANICAL ENGINEERING CONGRESS AND R&D EXPO
Proceedings

IMECE2003

November 15-21, 2003, Washington DC USA

IMECE2003-43540

the uniquely-corrected method to compute high power functions

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Abstract

The present paper provides a unique correction of the calculating procedures that have been prevailingly used in all computers and calculators for several decades. This correction must be made, based on the impacts of the computers and calculators have been extensively used in various fields of sciences, engineering, technologies and mathematics in education.

introduction

In recent years, several large companies that produce hand-held calculators have been competing continuously with one and other to break into the market for educators of all levels to learn and to use their calculators for teaching in the classrooms. During the summer months of June-August, 1995, many seminars were conducted in the metropolitan Boston Areas in the State of Massachusetts. CASIO offered workshops for the use of CFX-9800G; Texas Instruments offered workshops for the use of TI-82; Hewlett Packard offered for the use of HP 38G. Educators from the Boston Public Schools of the City of Boston, Massachusetts were invited and assigned to attend the workshops offered by CASIO and TI. Educators from everywhere were invited to attend the HP 38G workshops. It was undoubtedly that all the participants in these

workshops were benefited from utilizing the calculators to implement their mathematics and science curricula in one way or the other. In particular, educators from the State of Massachusetts came for thefor the workshops enthusiastically because they were given Professional Development Points (PDP) to fulfill the requirements for their re-certification to teach in the State of Massachusetts. Others came to seek for the choices of the appropriate calculator in order to implement their curricula effectively in their own classes. In addition to the above reasons, the first author of this paper also participated all the workshops in order to select theselect the appropriate calculator for the Advanced Placement Calculus that was being offered at the Charlestown High School of the Boston Public Schools under the grant funded by the EAGLE program of the Boston Plan For Excellence in The Public Schools in academic year 1995-96. The author learned a lot from attending those workshops and also fed back his opinions that could and should be updated and to be built-in into the calculators for wider applications not only for teaching but also for research in Physics and Mathematics. For examples: special functions like circular cylindrical and spherical Bessel's Functions; Legendre Functions and Error Function should be built-in into the calculator to solve many problems in Physics and in Engineering; likewise the Largrange Interpolation Formula should also be built-in for curve fitting.etc. After finishing the participation of all four workshops in July-August 1995, the first author was asked by Mr. Richard Stutman, a BPS mathematics teacher and colleague working in the Boston Teacher's Union (BTU), to solve a fun- and- game problem that was involved in high power functions of infinite orders. Responding to his request, the author sought to solve the problem by means of the CFX-9800G; TI-82 and HP-38G. As a result of this effort, a major error in the procedures of calculating the high power functions was found simultaneously in all three calculators CFX-9800G; TI-82 and HP-38G. The major error had been corrected and filed for examination with the U.S. Patent Office in order to clear the legal liability problems from the companies.

SUMMARY OF THE CORRECTION

Mathematical procedures of calculation of a mathematical function in symbolic form can be defined in many ways almost at our own wills. However, there are examples that procedures and the symbolic expression of the mathematical functions will not be unique if one changes its standard calculating procedures. The power functions are some of these examples. The errors to calculate the high power functions contribute from CFX-9800G; TI-82; and HP-38G are that they all start from the base upward to the higher exponential power, while the correct way should be started downward from the top exponential power to the base. These can be clearedbe cleared from the following examples A and B:

A. Errors in Numerical Computations

$$2^{3^{2}}$$

4 = 64= 64 = 4096 is not correct

3

2 3

3 = 9= 9 = 729 is not correct

2

3 2

2 = 8= 8 = 64 is not correct

B. Errors in Symbolic Representation uniquely Involvedinvolved in Solving Equations of High Power Functions.

x 2

x x

x - 2 = 0 means x - 2 = 0 leads to wrong answer x = 1.1414213562

x

x 3

x x

x - 2 = 0 means x - 2 = 0 leads to wrong answer x= 1.336709735

(3x) 2

(2x) (6 x)

x -2 = 0 means x -2 = 0 leads to wrong answer x = 1.100152079

DETAIL DESCRIPTION OF THE CORRECTION

The above examples A and B in errors can be corrected as the followings:

A. Correct Numerical Computation.

2

3 9

4 = 4 = 262,144

3

2 8

3 = 3 = 6,561

2

3 9

2 = 2 = 512

B. Correct Symbolic Representation Uniquely Involved in Solving Equations of High Power Functions.

$$x^{x^{x}} - 2 = 0 \qquad x = 1.476684337$$

$$x^{x^{x^{x}}} - 2 = 0 \qquad x = 1.446601432$$

$$x^{(2x)^{(3x)}} - 2 = 0 \qquad x = 1.064146805$$

$$(3x)^{(2x)^{x}} - 2 = 0 \qquad x = .6140723908$$

C. Examples of Correct Solutions of more Complicated Equations of High Power Functions.

$$2 \qquad 2$$

$$2\,(x\ \ ) \qquad (x\ \ )$$

$$x \qquad -\ 5\ x \qquad +\ 6\ =\ 0$$

x= 1.41421356 and x= 1.565552276

$$(x) \qquad (x)$$

$$2(x) \qquad (x)$$

$$(x) \qquad -\ 5\ (x) \qquad +\ 6\ =0$$

x = 1.476684337 and x = 1.635078475

$$x$$

$$x \qquad x$$

Denote y1(x) = x ; y2(x) = x ; y3(x) = x ;...etc.

The solutions of the following equations of High Power Functions can be obtained:

y2(x) - 2 = 0 x = 1.559610469

.y3(x) - 2 = 0 x = 1.476684337

y4(x) - 2 = 0 x = 1.446601432

y5(x) - 2 = 0 x = 1.432694806

y6(x) - 2 = 0 x = 1.425385621

y7(x) - 2 = 0 x = 1.421227912

y8(x) - 2 = 0 x = 1.418734462

y9(x) - 2 = 0 x = 1.417182504

y10(x) - 2 = 0 x = 1.416190183

y15(x) - 2 = 0 x = 1.414502086

y20(x) - 2 = 0 x = 1.414258764

y30(x) - 2 = 0 x = 1.414214713

y40(x) - 2 = 0 x = 1.414213592

y40(x) - 3 = 0 x = 1.447839583

y40(x) - 4 = 0 x = 1.449395757

y40(x) - 5 = 0 x = 1.44979292

y40(x) - 6 = 0 x = 1.449978187

y40(x) - 7 = 0 x = 1.450087526

y40(x) - 8 = 0 x = 1.4501607

y40(x) - 9 = 0 x = 1.450213659

y40(x) - 10 = 0 x = 1.450254088

CONCLUSION

What is claimed is:

1. A unique method of calculating and solving equations involved with High Power Functions has been made for all current and future computers and calculators that are built-in with the wrong procedures to calculate the High Power Functions.

Acknowledgments

The first author of this paper thanks to his friend and colleague Mr. Richard Stutman of Boston Public Schools for the fun-and-game problem which led to the discovery of the errors for the calculation of High Power Functions in computers and calculators back to 1995.

References

All documents that have been filed with the U.S. Patent Applications No. 08/980,657 by Po Kee Wong since 1995.

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